Extra Specific Heat Worksheet

Name: KEY Date: _____

Q = mcΔT, where **Q = heat energy**, **m = mass**, and **ΔT = change in temp.**
Remember, $\Delta T = (T_{final} - T_{initial})$. **Show all work and proper units.**

1. A 15.75-g piece of iron absorbs 1086.75 joules of heat energy, and its temperature changes from 25°C to 175°C. Calculate the specific heat capacity of iron.

$Q = mc\Delta T$

$1086.75 = (15.75g)\, c\, (175-25)$

$C_{Fe} = 0.46 \frac{J}{g°C}$

2. How many joules of heat are needed to raise the temperature of 10.0 g of aluminum from 22°C to 55°C, if the specific heat of aluminum is 0.90 J/g°C?

$Q = mc\Delta T$

$= (10g)\left(0.9\frac{J}{g°C}\right)(55-22)$

$Q = 297J$

3. Calculate the specific heat capacity of a piece of wood if 1500.0 g of the wood absorbs 67,500 joules of heat, and its temperature changes from 32°C to 57°C.

$Q = mc\Delta T$

$67500J = (1500g)\, c_w\, (57-32°C)$

$c_w = 1.8 \frac{J}{g°C}$

4. 100.0 g of 4.0°C water is heated until its temperature is 37°C. If the specific heat of water is 4.18 J/g°C, calculate the amount of heat energy needed to cause this rise in temperature.

$Q = mc\Delta T$

$Q = (100g)\left(4.18\frac{J}{g°C}\right)(37-4)$

$Q = 13794J$

5. 25.0 g of mercury is heated from 25°C to 155°C, and absorbs 455 joules of heat in the process. Calculate the specific heat capacity of mercury.

$$Q = mc\Delta T$$
$$455\,J = 25\,g\; c_{Hg}\; (155-25)$$
$$c_{Hg} = 0.14\ \frac{J}{g^{\circ}C}$$

6. What is the specific heat capacity of silver metal if 55.00 g of the metal absorbs 47.3J of heat and the temperature rises 15.0°C?

$$Q = mc\Delta T$$
$$47.3 = (55\,g)\, c_{Ag}\, (15^{\circ})$$
$$c_{Ag} = 0.057\ \frac{J}{g^{\circ}C}$$

7. What mass of water will change its temperature by 3 °C when 525 J of heat is added to it? The specific heat of water is 4.18 J/g °C

$$Q = mc\Delta T$$
$$525\,J = m\left(4.18\ \frac{J}{g^{\circ}C}\right)(3^{\circ}C)$$
$$m = 41.9\,g$$

8. A 0.3 g piece of copper is heated and fashioned into a bracelet. The amount of energy transferred by heat to the copper is 66,300 J. If the specific heat of copper is 390 J/g °C, what Is the change of the copper's temperature?

$$Q = mc\Delta T$$
$$66300\,J = (0.3\,g)\left(390\ \frac{J}{g^{\circ}C}\right)\Delta T$$
$$\Delta T = 567^{\circ}C$$